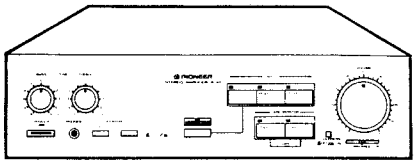
PIONEER®

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS



ORDER NO.
ARP1235-A

STEREO AMPLIFIER

A-33(BK)

MODEL A-33 (BK) COMES IN THREE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Power requirement	Export destination
HEZ	AC220V, 240V (switchable)	West Germany
HE	AC220V, 240V (switchable)	European continent
HB	AC220V, 240V (switchable)	United Kingdom

- This service manual is applicable to the A-33 (BK)/HEZ, HE and HB types.
- As to the HE and HB types, please refer to pages 17.

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Line voltage selection (HE, HEZ and HB types)

Line voltage can be changed with following steps.

1. Desconnect the AC power cord.
2. Remove the top cover.
3. Change the connection wire (To Power transformer) of Terminal No. 3 (WHITE) as follows.

Voltage	Terminal No. 3	Terminal No. 5
220V	White wire	. . . . .
240V	. . . . .	White wire

1. EXPLODED VIEWS AND PARTS LIST

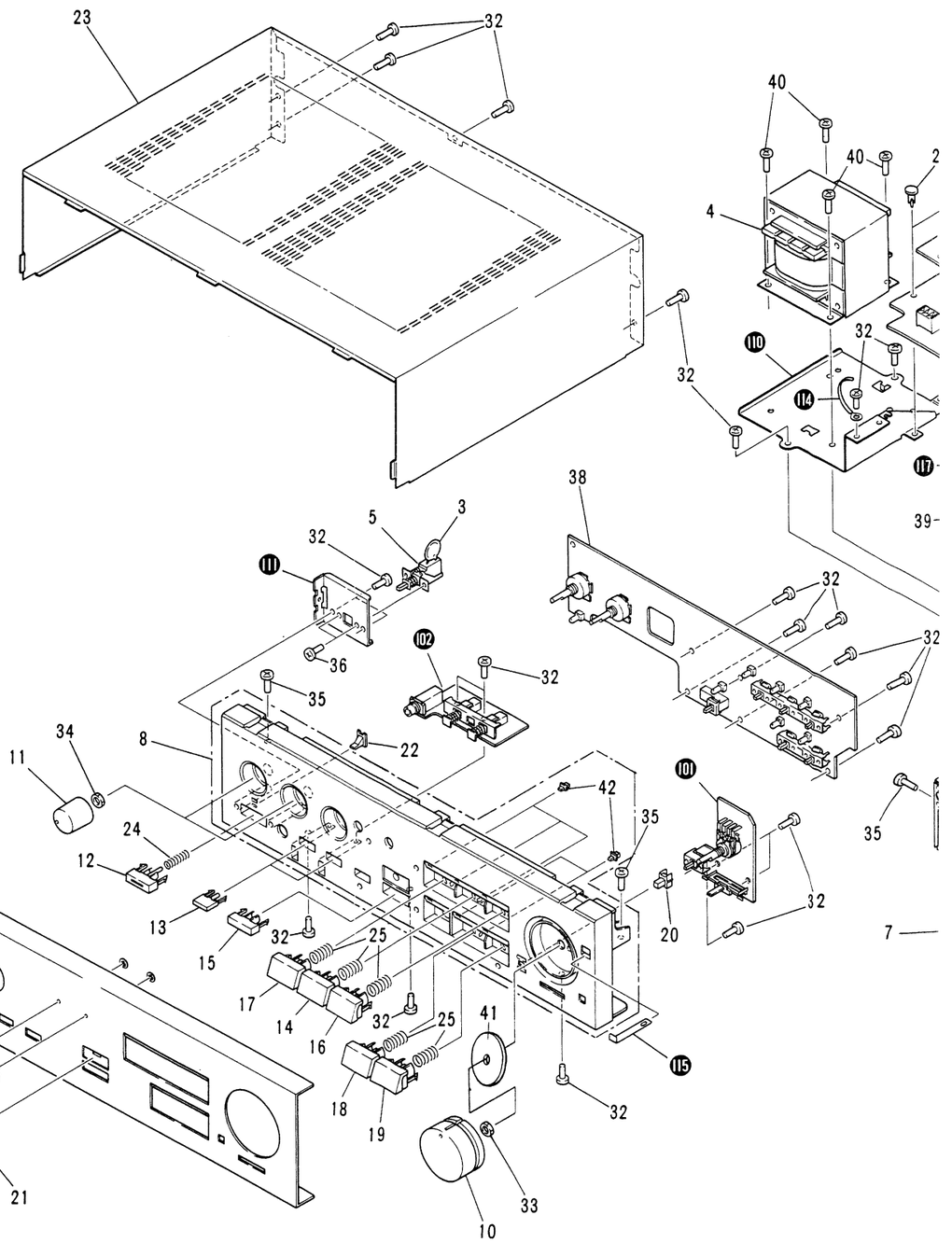
NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Parts List of Exterior

Mark	No.	Part No.	Description
⚠ ★★	1	2SA1264N	Transistor (Q3, Q4)
⚠ ★★	2	2SC3181N	Transistor (Q1, Q2)
⚠	3	ACG1003	Power capacitor (C1)
⚠	4	ATS1041	Power transformer (T1)
⚠ ★★	5	ASG-552	Push switch (S1)
⚠	6	AEK-405	Fuse (FU1)
	7	AEC1032	Leg assembly
	8	AMD1005	Panel Base assembly
	9	ANB1052	Front panel assembly
	10	AAB1011	Knob (VOLUME)
	11	AAB1012	Knob (TONE)
	12	AAD1060	Knob (POWER)
	13	AAD1061	Knob (SPEAKER)
	14	AAD1062	Function knob (PHONO)
	15	AAD1063	Direct knob (CD)
	16	AAD1064	Function knob (TUNER)
	17	AAD1065	Function knob (CD)
	18	AAD1067	Function knob (TAPE1)
	19	AAD1068	Function knob (TAPE2)
	20	AAD1070	Knob (LOUDNESS)
	21	AAK1124	CD Direct plate
	22	AAT-110	Indicator Lens C
	23	ANE1059	Bonnet
	24	ABH1015	Coil spring
	25	ABH1019	Coil spring
	26	AEC-525	Nylon rivet
	27	AEP-313	Mica seat
	28	ABA-115	Screw
	29	ABA-258	Screw
	30	.....	.....
⚠	31	ADG-068	AC Power cord
	32	BBZ30P080FZK	Screw
	33	NK70FUC	Nut
	34	NK90FUC	Nut
	35	VBZ30P080FMC	Screw
	36	VMZ30P060FMC	Screw
	37	AWZ1214	AF Complex assembly
	38	AWZ1215	Tone, Function assembly
	39	AWT1003	Line filter assembly
	40	BBZ30P080FCU	Screw
	41	ANG1088	Earth ring
	42	AAT-118	Indicater lens C
	101		Volume assembly
	102		Speaker switch assembly
	103		SP Terminal assembly
	104		Pin jack assembly
	105		Transistor assembly
	106		Terminal (GND)
	107		Chassis
	108		Rear panel
	109		Bottom plate
	110		Transframe
	111		Switch holder
	112		P.C.B. Holder
	113		Heat sink
	114		Binder
	115		Plate (EARTH)

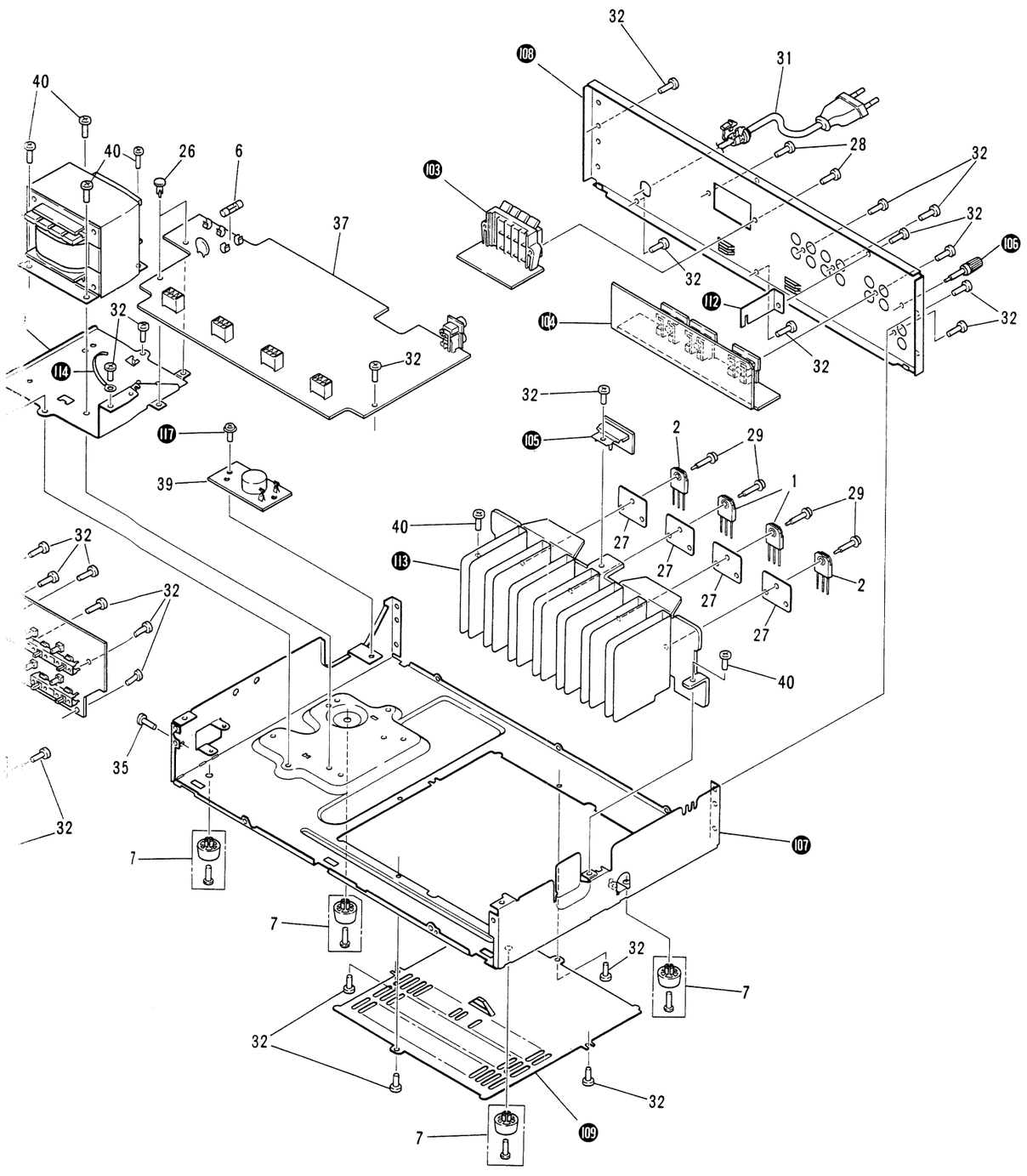
Exterior

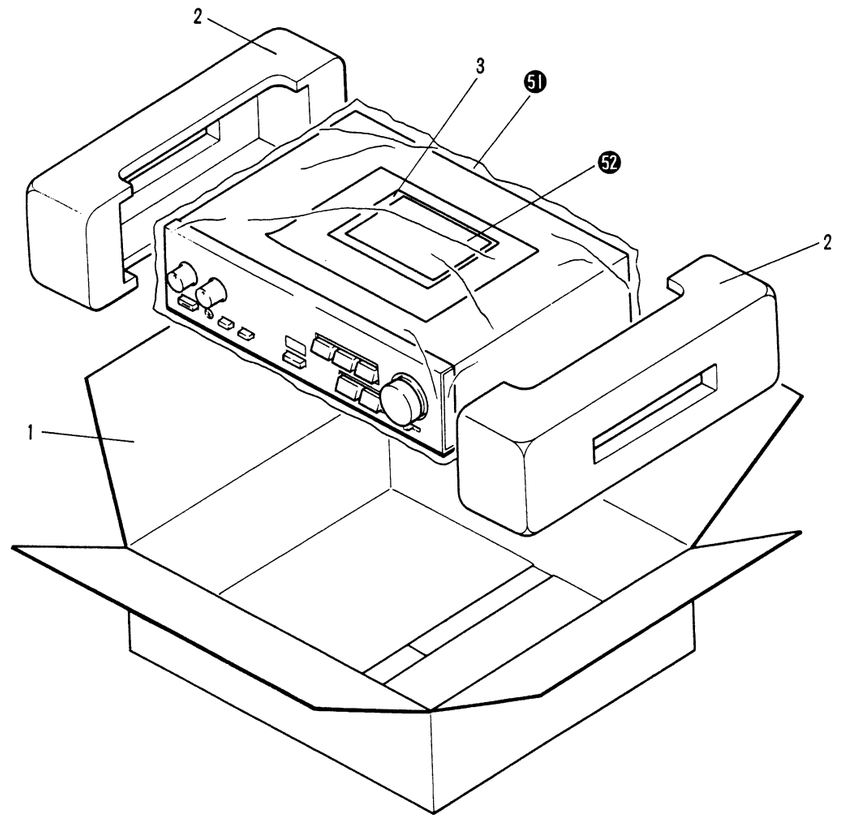


2. PACKING

Parts List of Packing

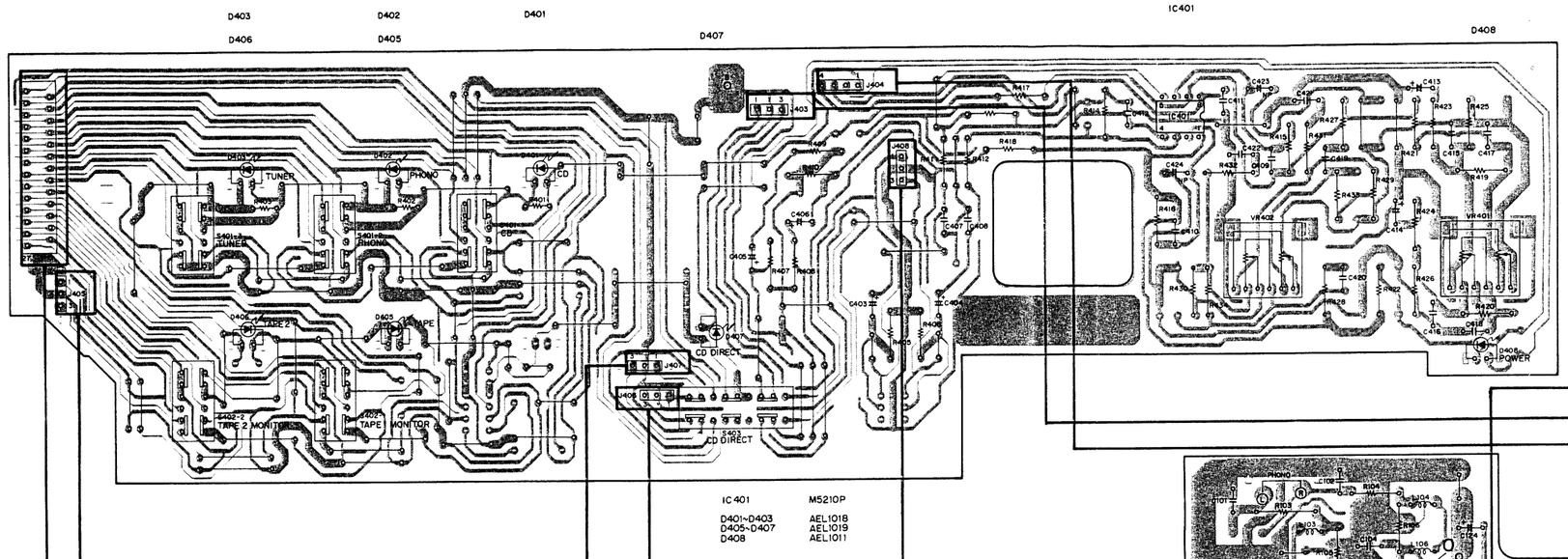
Mark	No.	Part No.	Description
	1	AHD1110	Packing case
	2	AHA1015	Front Rear pad
	3	ARC1019	Operating instructions
	51		Seat
	52		Warranty card





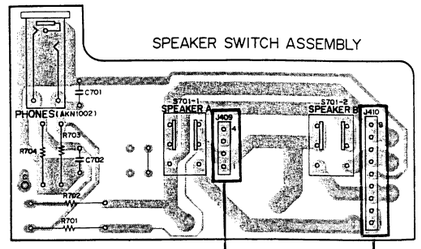
3. P.C.BOARDS CONNECTION DIAGRAM

TONE, FUNCTION ASSEMBLY AWZ1215

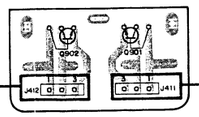


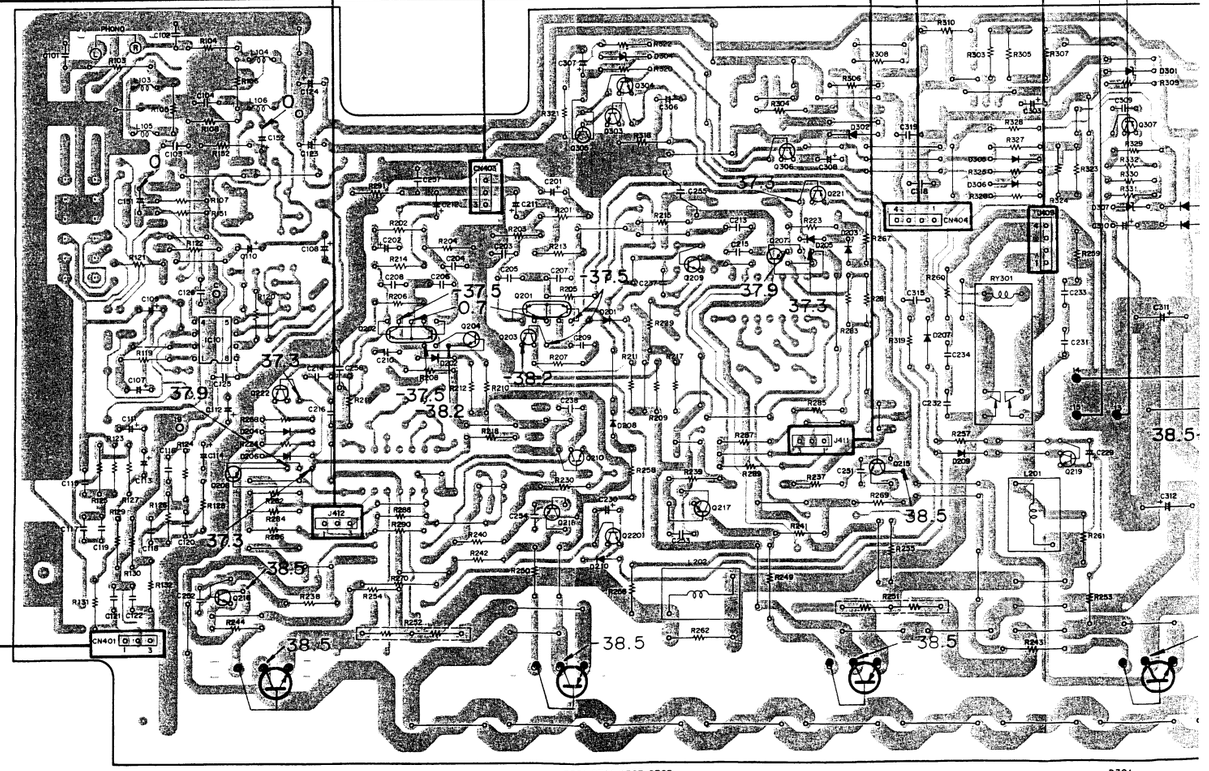
IC 401	M5210P
D401~D403	AEL1018
D405~D407	AEL1019
D408	AEL1011

SPEAKER SWITCH ASSEMBLY

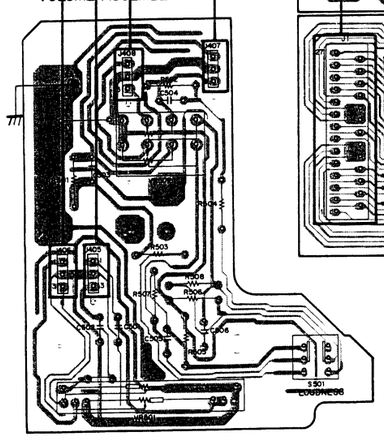


TRANSISTOR ASSEMBLY
Q901,902 2SC2603

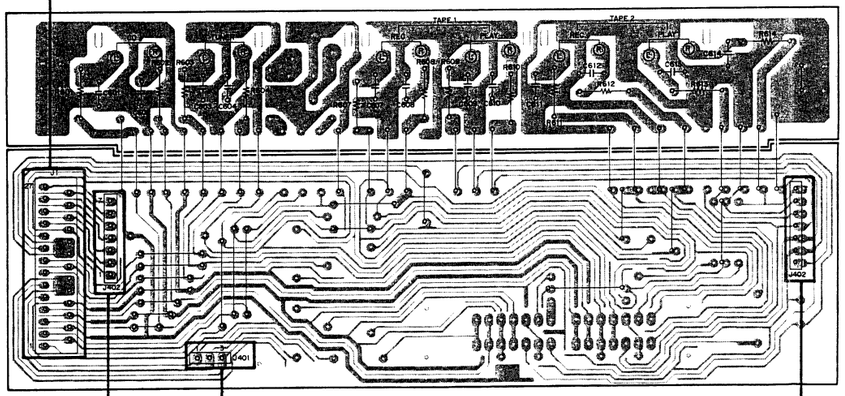




VOLUME ASSEMBLY

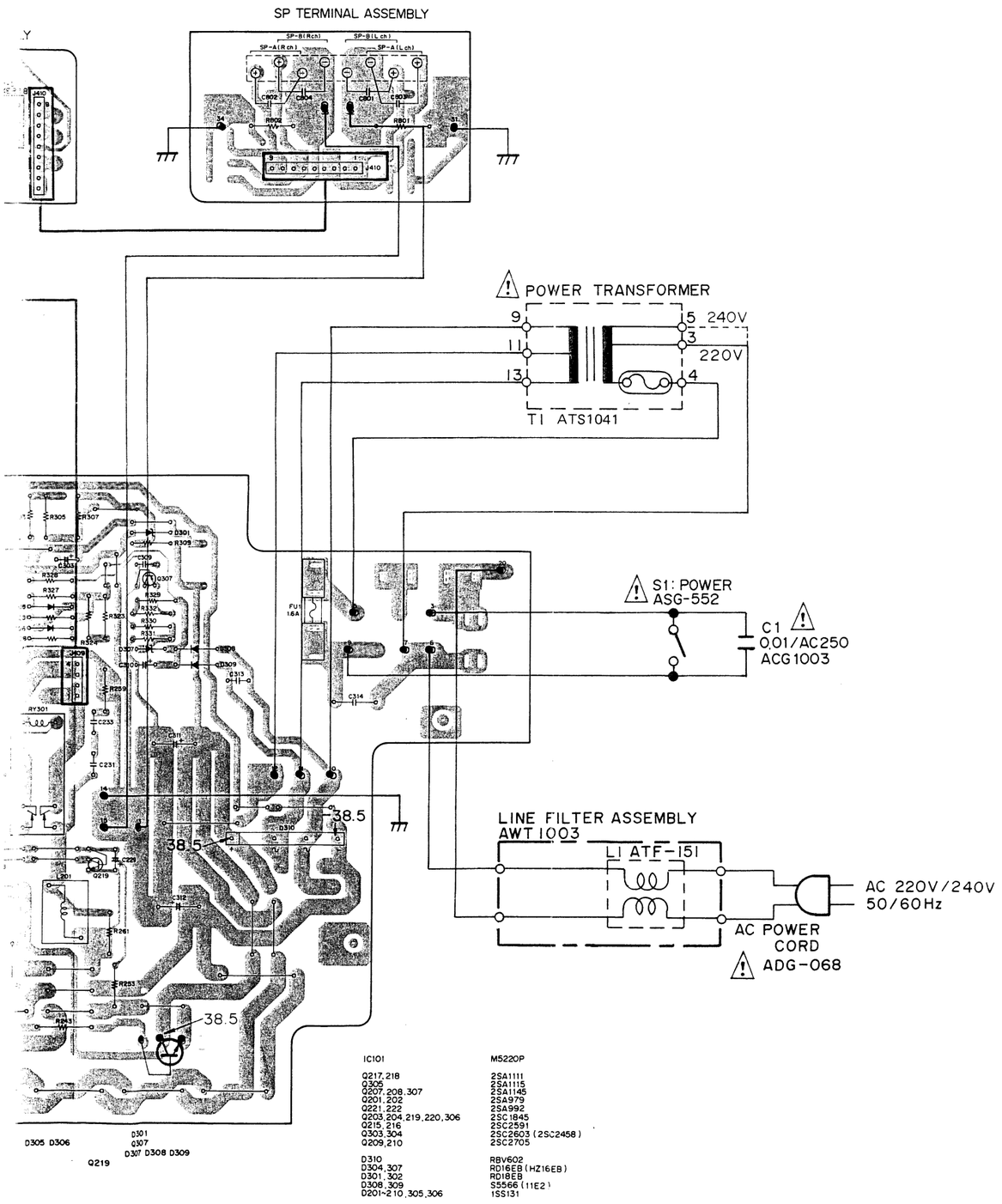


PINJACK ASSEMBLY



D304 Q304 Q305 Q303
D306 Q221 D302
D305 D306
D301
Q307
IC101 Q222
Q208
Q216
D204 D206
Q202 Q204
D202
Q203 Q201 D201
D208
Q210 Q218 Q220 D210
Q209 Q207
Q217
D205 D203
Q215
D207
D209
Q219
D307 D308 D309

AF COMPLEX ASSEMBLY AWZ1214

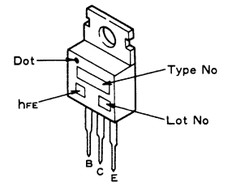


IC101	M5220P
Q217,218	2SA1111
Q305	2SA1115
Q207,208,307	2SA1145
Q201,202	2SA979
Q221,222	2SA992
Q203,204,219,220,306	2SC1845
Q215,216	2SC2591
Q303,304	2SC2603 (2SC2458)
Q209,210	2SC2705
D310	RBV602
D304,307	RD16EB (HZ16EB)
D301,302	RD18EB
D308,309	S5566 (11E2)
D201~210,305,306	1SS131

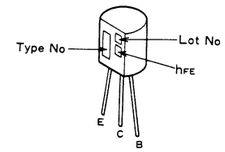
External Appearance of Transistors and ICs

A

2SC2591
2SA111

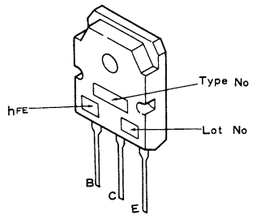


2SA992
2SC1845

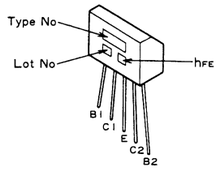


B

2SC3181N
2SA1264N

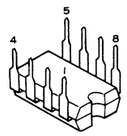


2SA979

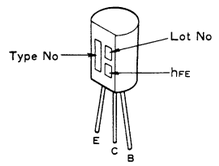


C

M5220P
M5210P

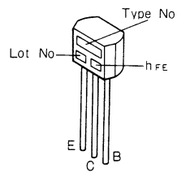


2SA1145
2SC1845

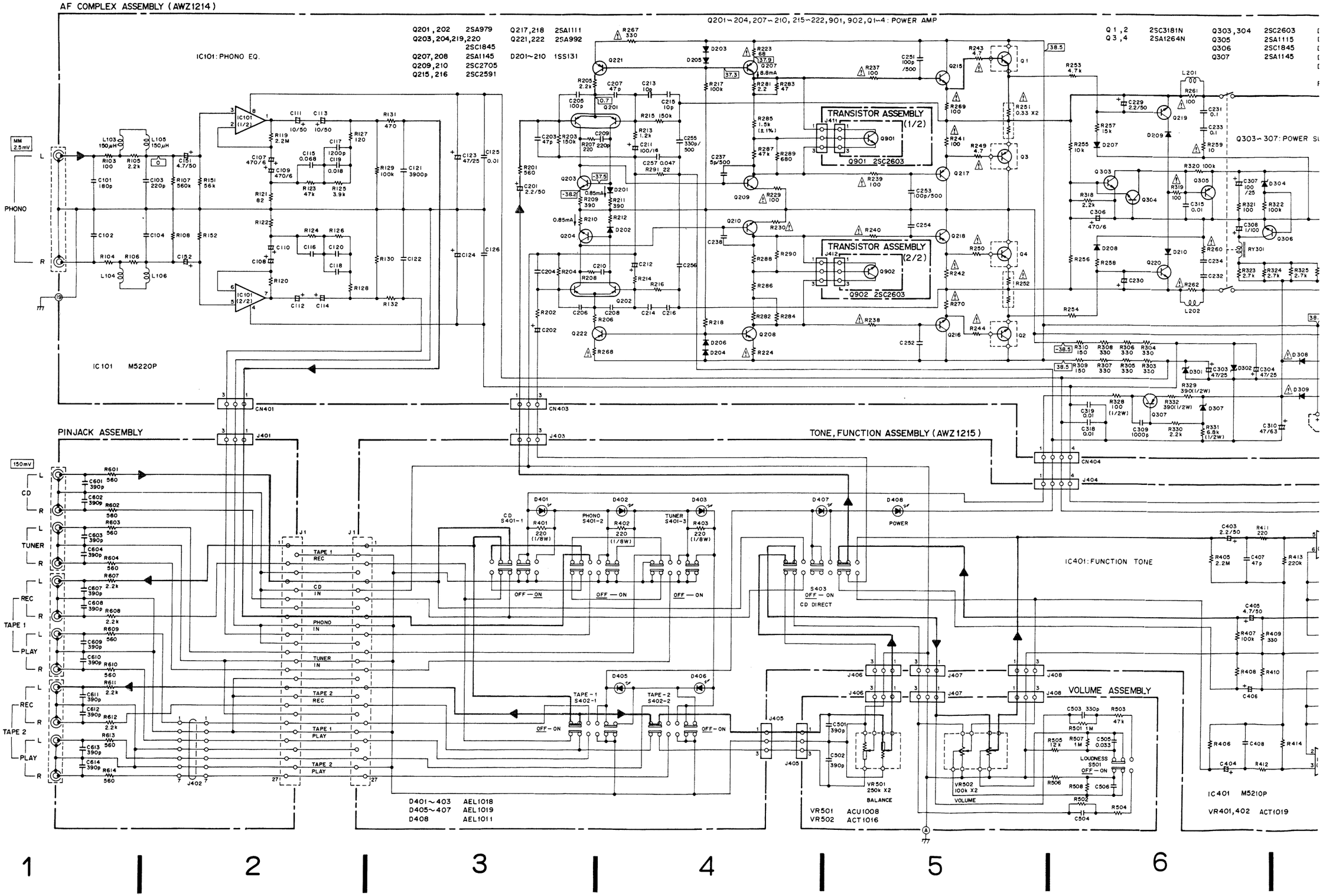


D

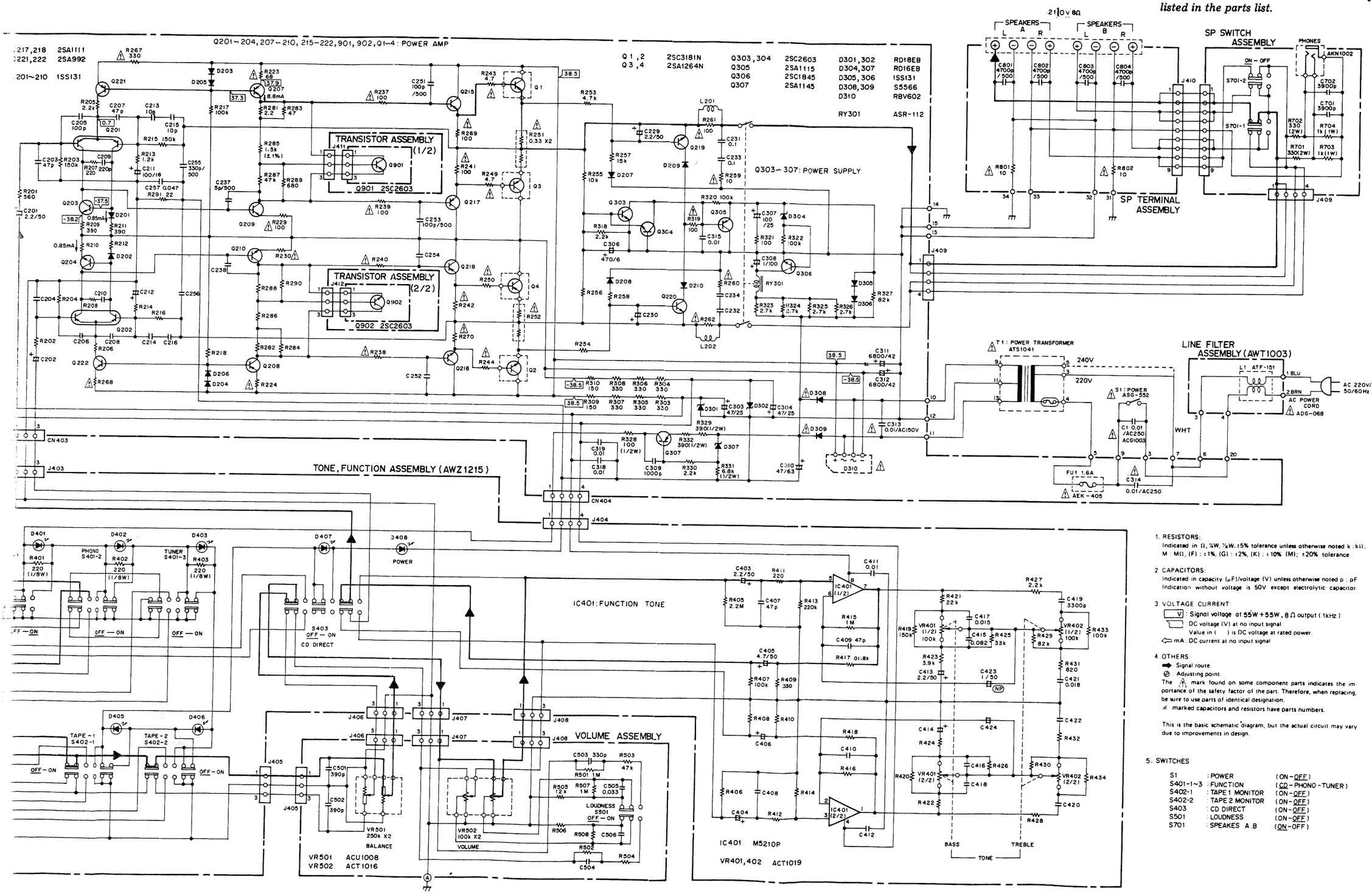
2SA1115
2SC2603



4. SCHEMATIC DIAGRAM



NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



1. RESISTORS:
Indicated in Ω, ¼W, ½W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% (M): ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE CURRENT:
(V) : Signal voltage at 55W + 55W, 8Ω output (1kHz)
DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power.
⇦mA : DC current at no input signal

4. OTHERS:
➡ Signal route.
⊘ Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES

S1	: POWER	(ON-OFF)
S401-1~3	: FUNCTION	(CD-PHONO-TUNER)
S402-1	: TAPE 1 MONITOR	(ON-OFF)
S402-2	: TAPE 2 MONITOR	(ON-OFF)
S403	: CD DIRECT	(ON-OFF)
S501	: LOUDNESS	(ON-OFF)
S701	: SPEAKES A.B	(ON-OFF)

5. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	AF Complex assembly	AWZ1214
	Tone, Function assembly	AWZ1215
	Line filter assembly	AWT1003
	Volume assembly	Non supply
	Speaker switch assembly	Non supply
	SP Terminal assembly	Non supply
	Pin jack assembly	Non supply
	Transistor assembly	Non supply

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
⚠ ★★	Q3, Q4	2SA1264N
⚠ ★★	Q1, Q2	2SC3181N

SWITCH

Mark	Symbol & Description		Part No.
⚠ ★★	S1	Push switch (POWER)	ASG-552

TRANSFORMER

Mark	Symbol & Description		Part No.
⚠ ★	T1	Power transformer (220V, 240V)	ATS1041

CAPACITOR

Mark	Symbol & Description		Part No.
⚠	C1	Power capacitor (0.01μF/400V)	ACG1003

FUSE

Mark	Symbol & Description		Part No.
⚠ ★★	FU1	Fuse (T1.6A)	AEK-405

OTHERS

Mark	Symbol & Description	Part No.
⚠	AC Power cord	ADG-068

AF Complex Assembly (AWZ1214)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC101	M5220P
★★	Q217, Q218	2SA1111
★★	Q305	2SA1115
★★	Q207, Q208, Q307	2SA1145
★★	Q201, Q202	2SA979
★★	Q221, Q222	2SA992
★★	Q203, Q204, Q219, Q220, Q306	2SC1845
★★	Q215, Q216	2SC2591
★★	Q303, Q304	2SC2603 (2SC2458)
★★	Q209, Q210	2SC2705
★	D310	RBV602
★	D304, D307	RD16EB (HZ16EB)
★	D301, D302	RD18EB
★	D308, D309	S5566 (11E2)
★	D201–D210, D305, D306	1SS131

RELAY

Mark	Symbol & Description	Part No.
★★	RY301	ASR-112 (ASR-107, 109)

COILS

Mark	Symbol & Description	Part No.
	L201, L202	ATH1009
	L103–L106	LAU151K

CAPACITORS

Mark	Symbol & Description	Part No.
⚠	C313	ACG-019
⚠	C314	ACG1003
	C311, C312	ACH1019
	C237, C238	CCCSL050C500
	C213–C216	CCCSL100D50
	C205, C206	CCCSL101J50
	C251–C254	CCCSL101K500
	C209–C210	CCCSL221J50
	C203, C204, C207, C208	CCCSL470J50
	C101, C102	CCDSL181J50
	C103, C104	CCDSL221J50
	C308	CEAS010M100
	C111–C114	CEAS100M50
	C211, C212	CEYA101M16
	C307	CEAS101M25
	C201, C202	CEYA2R2M50
	C229, C230	CEAS2R2M50
	C151, C152	CEAS4R7M50
	C123, C124, C303, C304	CEAS470M25
	C310	CEAS470M63
	C107–C110, C306	CEAS471M6
	C309	CKCYB102K50
	C315, C318, C319	CKCYF103Z50
	C255, C256	CKDYB331K500
	C125, C126	CKDYF103Z50
	C257	CKDYF473Z50
	C231–C234	CQMA104K50
	C117, C118	CQMA122J50
	C119, C120	CQMA183J50
	C121, C122	CQMA392K50
	C115, C116	CQMA683J50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
⚠	R251, R252	ACN-139
	R328, R329, R332, R331	RD1/2PM□□□J
⚠	R237–R240, R243, R244, R249, R250	RFA1/4PS□□□J
	R285, R286	RN1/4PQ1501F
⚠	R223, R224, R229, R230, R241, R242, R259–R262, R267–R270, R319	RD1/4PMF□□□J
	Other resistors	RD1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal 2P (PHONO)	AKB-119
	Transistor socket	AKH-017

Tone, Function Assembly (AWZ1215)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC401	M5210P
★	D408	AEL1011
★	D401–D403	AEL1018
★	D405–D407	AEL1019

SWITCHES

Mark	Symbol & Description		Part No.
★★	S401	Push switch (FUNCTION)	SEA6V4B4B4L
★★	S402	Push switch (TAPE1, TAPE2)	SEA6V4B4S
★★	S403	Push switch (CD DIRECT)	SECV6S

CAPACITORS

Mark	Symbol & Description	Part No.
	C407–C410	CCCSL470J50
	C423, C424	CEANP010M50
	C403, C404, C413, C414	CEAS2R2M50
	C405, C406	CEAS4R7M50
	C411, C412	CKCYF103Z50
	C417, C418	CQMA153K50
	C421, C422	CQMA183K50
	C419, C420	CQMA332K50
	C415, C416	CQMA823K50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	VR401, VR402 Variable resistor	ACT1019
	R401–R403	RD1/8PM221J
	Other resistors	RD1/4PM□□□J

Line, Filter Assembly (AWT1003)

COIL

Mark	Symbol & Description	Part No.
	L1 Line filter	ATF-151

Volume Assembly

SWITCH

Mark	Symbol & Description	Part No.
★★	S501 (LOUDNESS)	SEAV25

CAPACITORS

Mark	Symbol & Description	Part No.
	C503, C504	CKCYB331K50
	C501, C502	CKCYB391K50
	C505, C506	CQMA333K50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR502 Variable resistor	ACT1016
★	VR501 Slide volume	ACU1008
	Other resistors	RD1/4PM□□□J

Speaker Switch Assembly

SWITCH

Mark	Symbol & Description	Part No.
★★	S701 Push switch (SPEAKERS)	SUL6LXBXSC

CAPACITORS

Mark	Symbol & Description	Part No.
	C701, C702	CKCYB392K50

RESISTORS

Mark	Symbol & Description	Part No.
	R703, R704	RS1PMF102J
	R701, R702	RS2LMF331J

OTHERS

Mark	Symbol & Description	Part No.
	Jack (HEAD PHONE)	AKN1002

SP Terminal Assembly

CAPACITORS

Mark	Symbol & Description	Part No.
	C801–C804	CKDYB472K500

RESISTORS

Mark	Symbol & Description	Part No.
	R801, R802	RD1/4PMF100J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal 8P (SPEAKERS)	AKE-111

Pin Jack Assembly

CAPACITORS

Mark	Symbol & Description	Part No.
	C601–C604, C607–C614	CKDYB391K50

RESISTORS

Mark	Symbol & Description	Part No.
	R607, R608, R611, R612	RD1/4PM222J
	R603, R604, R609, R610, R613, R614	RD1/4PM561J
	R601, R602	RDR1/4PM561J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal 4P (CD, TUNER, TAPE1, TAPE2)	AKB-115

Transistor Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	Q901, Q902	2SC2603

6. FOR HE AND HB TYPES

6.1 CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

The HE and HB types are the same as the HEZ type with the exception of the following sections:

Mark	Symbol & Description	Part No.			Remarks
		A-33 [BK]/ HEZ type	A-33 [BK]/ HE type	A-33 [BK]/ HB type	
	AF Complex assembly	AWZ1214	AWZ1240	AWZ1240	
	SP Terminal assembly	Non supply	Non supply	Non supply	
	Pin jack assembly	Non supply	Non supply	Non supply	
	Line filter assembly	AWT1003	.....	.....	
	Screw	ABA-115	.....	.....	
	Chassis	Non supply	Non supply	Non supply	
	Rear panel	Non supply	Non supply	Non supply	
	Operating instructions (German)	ARC1019	.....	.....	
	Operating instructions (English/German/French/Italian)	.....	ARE1038	ARE1038	
⚠	AC Power cord	ADG-068	ADG-068	ADG-063	
⚠ ★★	FU1 Fuse (T1.6)	AEK-405	AEK-405	.....	
⚠ ★★	FU1 Fuse (250V)	.....	.....	AEK-510	

6.2 ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

AF Complex Assembly (AWZ1240)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC101	M5220P
★★	Q217C, Q218	2SA1111
★★	Q305	2SA1115
★★	Q207, Q208, Q307	2SA1145
★★	Q201, Q202	2SA979
★★	Q221, Q222	2SA992
★★	Q203, Q204, Q219, Q220, Q306	2SC1845
★★	Q215C, Q216C	2SC2591
★★	Q303, Q304	2SC2603 (2SC2458)
★★	Q209, Q210	2SC2705
⚠ ★	D310	RBV602
★	D304, D307	RD16EB (HZ16EB)
★	D301, D302	RD18EB (HZ182)
⚠ ★	D308, D309	S5566 (11E2)
★	D201–D210, D305, D306	1SS131

RELAY

Mark	Symbol & Description	Part No.
★★	RY301	ASR-112 (ASR-107) (ASR-109)

COILS

Mark	Symbol & Description	Part No.
	L201, L202	ATH1004

CAPACITORS

Mark	Symbol & Description	Part No.
⚠	C313	ACG019
⚠	C314	ACG1003
	C311, C312	ACH1019
	C237, C238	CCCSL050C500
	C213–C216	CCCSL100D50
	C205, C206	CCCSL101J50
	C251–C254	CCCSL101K500
	C209–C210	CCCSL221J50
	C203, C204, C207, C208	CCCSL470J50
	C103, C104	CCDSL221J50
	C308	CEAS010M100
	C111–C114	CEAS100M50
	C211, C212	CEYA101M16
	C307	CEAS101M25
	C201, C202	CEYA2R2M50
	C229, C230	CEAS2R2M50
	C151, C152	CEAS4R7M50
	C123, C124, C303, C304	CEAS470M25
	C310	CEAS470M63
	C107–C110, C306	CEAS471M6
	C309	CKCYB102K50
	C315,	CKCYF103Z50
	C125, C126	CKDYF103Z50
	C231–C234	CQMA104K50
	C117, C118	CQMA122J50
	C119, C120	CQMA183J50
	C121, C122	CQMA392K50
	C115, C116	CQMA683J50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
⚠	R251, R252	ACN-139
	R328, R329, R332, R331	RD1/2PM□□□J
⚠	R223, R224, R261–R262, R267–R270	RD1/4PMF□□□J
	R241, R242, R259, R260	RD1/4PMFL□□□J
⚠	R229, R230, R237–R240, R243, R244, R249, R250	RFA1/4PS□□□J
	R285, R286	RN1/4PQ1501F
	Other resistors	RD1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal 2P (PHONO)	AKB-119
	Transistor socket	AKH-017

Pin Jack Assembly

RESISTORS

Mark	Symbol & Description	Part No.
	R607, R608, R611, R612	RD1/4PM222J
	R603, R604, R609, R610, R613, R614	RD1/4PM561J
	R601, R602	RDR1/4PM561J

OTHERS

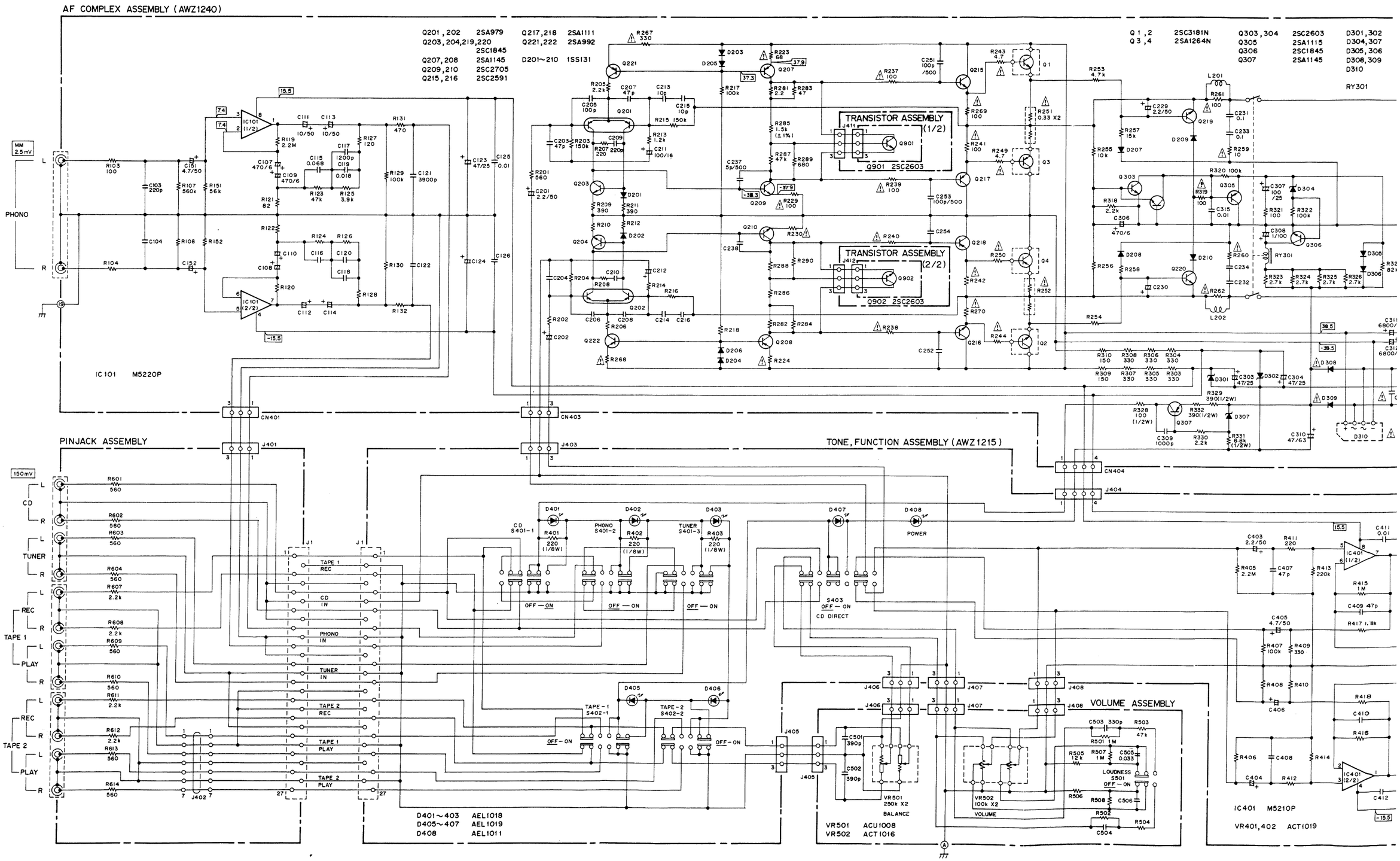
Mark	Symbol & Description	Part No.
	Terminal 4P (CD, TUNER, TAPE1, TAPE2)	AKB-115

SP Terminal Assembly

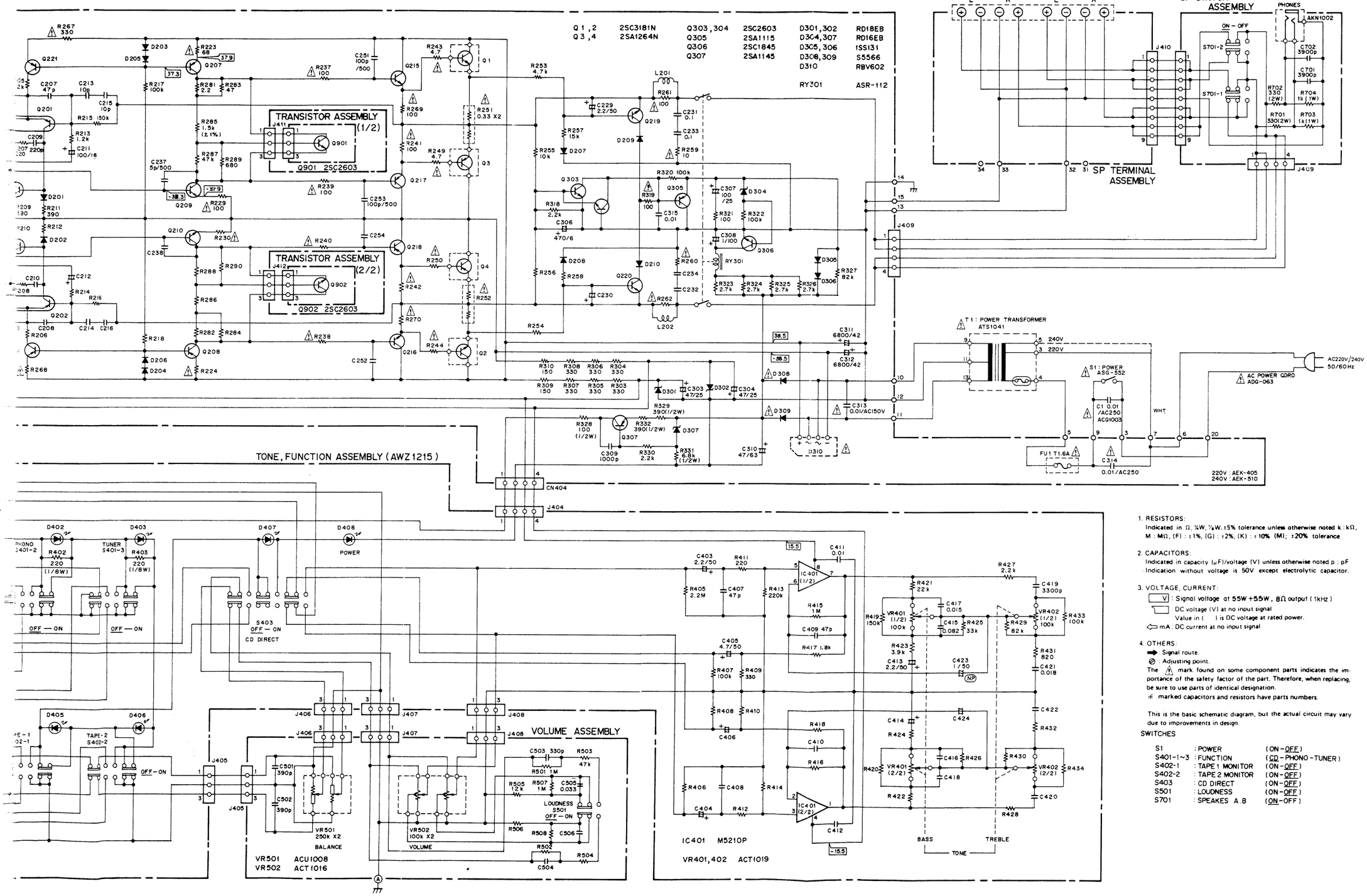
OTHERS

Mark	Symbol & Description	Part No.
	Terminal 8P (SPEAKERS)	AKE-111

6.3 SCHEMATIC DIAGRAM



NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



1. RESISTORS:
Indicated in Ω, ¼W, ⅛W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% (M); ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
V : Signal voltage at 55W+55W, 8Ω output (1kHz)
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power.
⇦ mA : DC current at no input signal

4. OTHERS:
➡ Signal route.
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

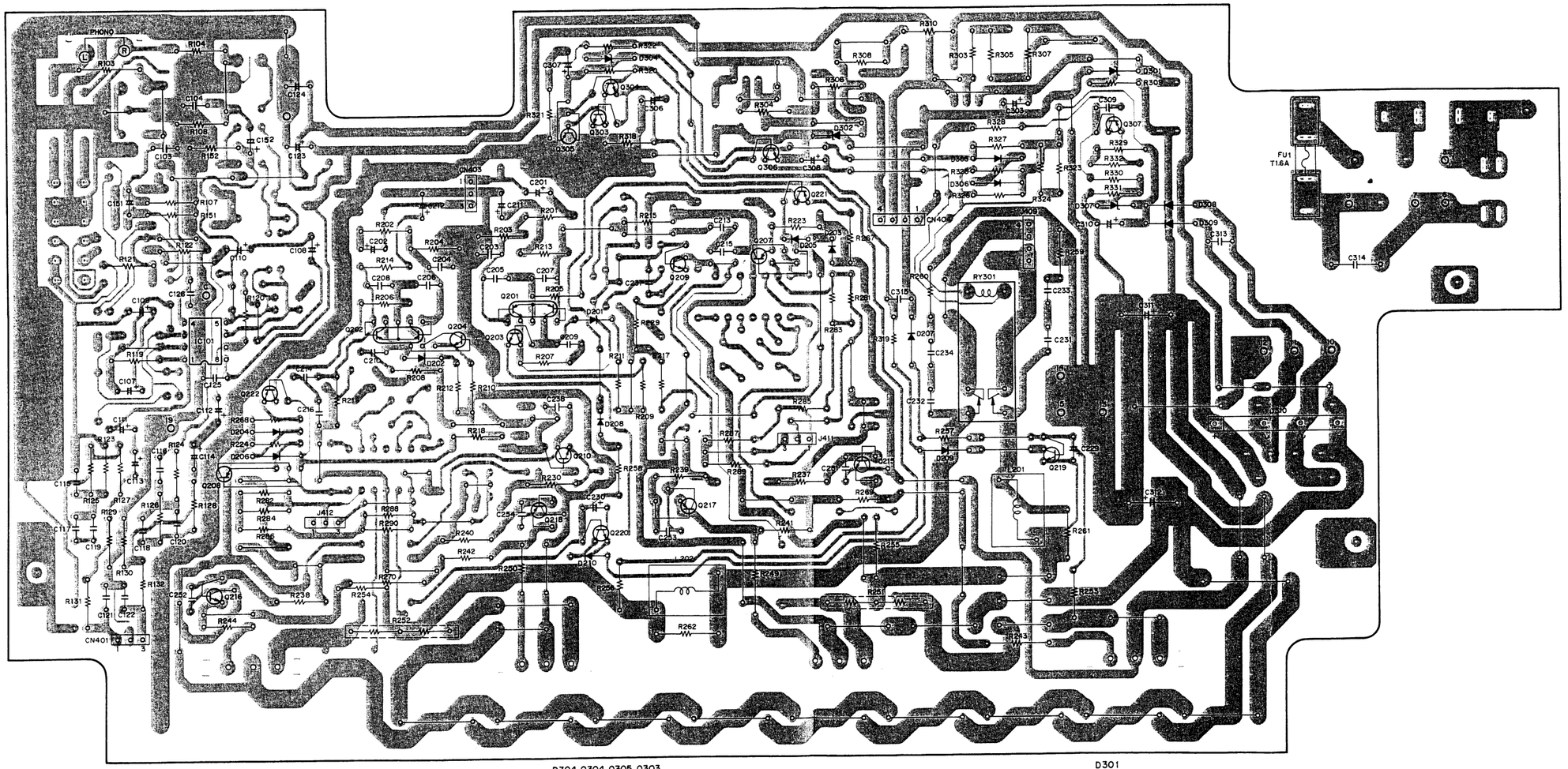
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

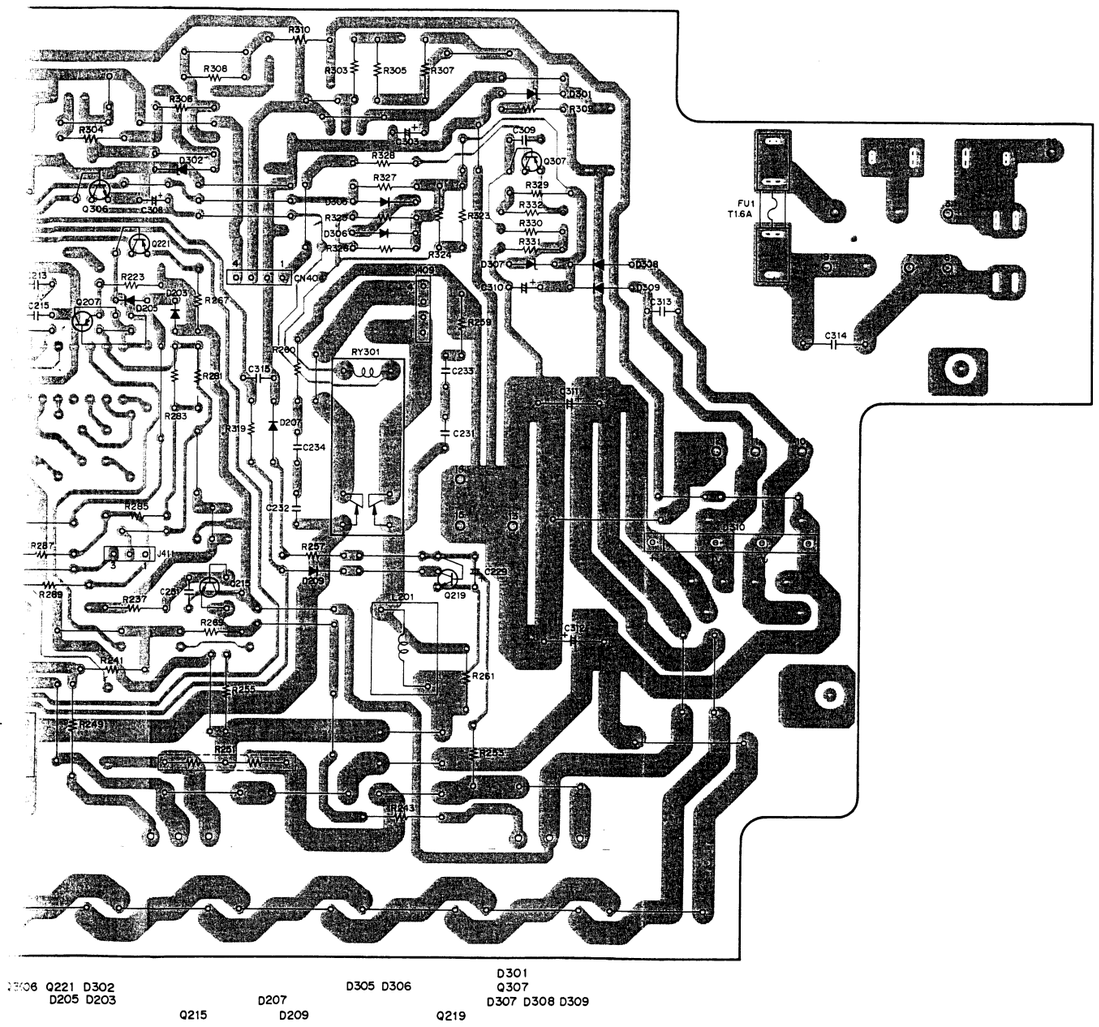
SWITCHES

S1	: POWER	(ON-OFF)
S401-1~3	: FUNCTION	(CD - PHONO - TUNER)
S402-1	: TAPE 1 MONITOR	(ON-OFF)
S402-2	: TAPE 2 MONITOR	(ON-OFF)
S403	: CD DIRECT	(ON-OFF)
S501	: LOUDNESS	(ON-OFF)
S701	: SPEAKES A,B	(ON-OFF)

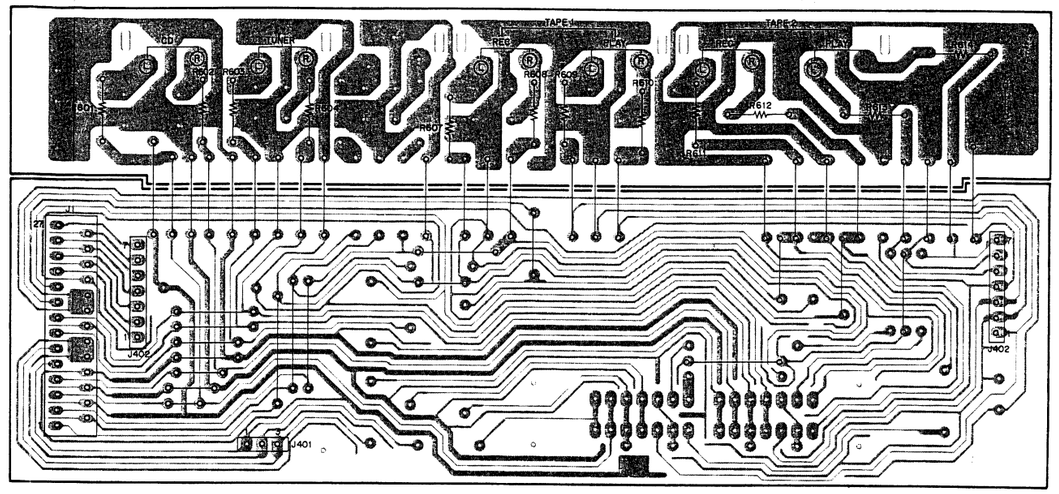
6.4 P.C. BOARD PATTERNS

AF COMPLEX ASSEMBLY (AWZ1240)





PINJACK ASSEMBLY



SP TERMINAL ASSMBLY